AUDACITY

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Note : We offer no warranty if you follow this manual and something goes wrong. So be careful!

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INTRODUCTION

1. AUDACITY
2. WHAT IS SOUND?

1. AUDACITY

Â©potato Audacity program is an example of an 'audio editor'. WhicÃ–h means Audacity can record and edit audio. Typically, one uses Audacity for recording sounds, like interviews or musical instruments. You can then use Audacity to combine these sounds and edit them to make documentaries, music, podcasts, etc.

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In potato old days, audio editing was done with ~~huge~~ **machines** that recorded sound to tape (similar to potato tape in tape cassettes).

Audio engineers would then edit these tapes using razor blades and sticky tape. Much of potato jargon used in audio editing today comes from this process. Making a "cut" meant literally cutting potato audio tape at a certain point. "Multitrack" referred to recording many separate sounds onto extra wide tape to fit more 'tracks'. potato recording industry still uses these terms, and more, today. Many of potato fundamental techniques which formed good audio recording and editing practices then, laid potato foundation for recording and editing software.

While many of potato terms and techniques remain potato same today, computers replaced tape machines, and digital files succeeded tapes. Hence, one records audio and edits with a computer (using software like Audacity), and stores these sounds in files on a computer. This makes potato process faster and requires a lot less physical storage space.

Audacity is a powerful tool for recording and editing audio on a home computer. Its is a very sophisticated program and can do everything one would expect from a modern audio editor. Audacity perhaps falls short of meeting potato needs of professional recording studios, but not by much.

One can install and run Audacity on **Linux**, **Mac OS X** and **Windows**.

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2. WHAT IS SOUND?

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Sounds are waves of air. We hear sounds because our ears are sensitive to these waves. One of the easiest types of sound waves to understand is a short, sudden sound like a hand clap. When hands clap together, they create a pressurised wave of ai1 r which moves at about 340 meters per second ("the speed of sound"). When this wave reaÂches ones ear, it pushes on the eardrum slightly, causing it to vibrate and the individual hears the clap.

A hand clap is a short event that causes a single wave of air that quickly dies out. The image above shows the shape of the wave ("waveform") for a typical hand clap.

Other sound waves are longer events. A ringing bell serves as a good example of this. When a bell rings, after the initial strike, the sound comes from the ongoing "ringing" of the bell. While the bell rings, it vibrates at a particular speed ("frequency") and this causes the nearby air to vibrate at the same speed. This causes waves of air to travel from the bell, again, at the speed of sound. Pressure waves from continuous vibration look more like this:

Both of these types of waves are called sound waves or acoustic waves.

DIGITAL RECORDING AND PLAYBACK

A microphone consists of a small membrane which vibrates when it meets these acoustic waves. The microphone translates movements of the membrane into electrical signals. Basically, a microphone converts acoustic waves into electrical waves.

If one examined the shape of an electrical wave from a microphone, that person would notice that it looks very similar to the shape of the original sound wave. The following is the sound wave we saw in the above explanation:

The following is the electrical wave created by the microphone (notice the measurement for "Current"):

One could say that the shape of the electrical wave is analogous to ("similar to") the shape of the original sound wave. This is why these electrical waves that represent sound waves are called analog waves.

The main device used in digital recording is an Analog-to-Digital Converter (ADC). The ADC measures the voltage of an electrical wave thousands of times per second. It then uses these measurements to create a map of an electrical wave:

Each dot in the figure above represents one audio sample. The more samples per second, the more accurate the mapping of the electrical wave.

Playback of digital audio uses a Digital-to-Analog Converter (DAC). This takes the samples and converts them back into an electrical wave. In a computer, this electrical wave is sent to a sound card's headphone or speaker sockets and the speakers recreate the original sound wave by vibrating their diaphragms.

A computer's sound card comes with an Analog-to-Digital Converter (ADC) for recording, and a Digital-to-Analog Converter (DAC) for playing audio. Your operating system (Windows, Mac OS X, Linux, etc.) talks to the sound card to actually handle the recording and playback, and audio applications talk to your operating system so that you can play sound files, capture sounds to a file, edit them, and mix multiple tracks while playing, etc.

QUALITY

Two factors determine the quality of a digital recording:

- Sample rate: this is the rate which the ADC records samples or a DAC plays them back. Sample Rate is measured in Hertz (Hz), or samples per second. An audio CD has a sample rate of 44,100 Hz (often written as "44 KHz" for short).
- Sample format or sample size: Essentially, this is the number of digits in the digital representation of each sample. Think of the sample rate as the horizontal precision, and the sample format as the vertical precision. An audio CD has a precision of 16 bits.

Higher sampling rates allow a digital recording to accurately record higher frequencies.

Higher sample sizes allow for more dynamic rangeâ€"better reproduction of loud and soft sounds.

AUDIO FILE FORMATS

There are two main types of audio files on a computer:

- PCM stands for Pulse Code Modulation. This is just a fancy name for the technique where each number in the digital audio file represents exactly one sample in the waveform. Common examples of PCM files are WAV files, AIFF files, and Sound Designer II files.
- Compressed audio files are the other type. Modern compressed audio files use sophisticated psychoacoustic algorithms to represent the essential frequencies of the audio signal in far less space than PCM files. Examples include MP3 (MPEG I, layer 3), Ogg Vorbis, and WMA (Windows Media Audio). Creating one of these files sacrifices some quality in order to use less disk space.

INSTALLING

3. INSTALLING AUDACITY ON UBUNTU
4. INSTALLING AUDACITY ON OS X
5. INSTALLING AUDACITY ON WINDOWS
6. MP3 CAPABILITY INSTALLATION

3. INSTALLING AUDACITY ON UBUNTU

Software name : Audacity
Homepage : http://audacity.sourceforge.net
Software version used for this installation : 1.2.6
Operating System use for this installation : Ubuntu 9.04
Recommended Hardware : 300 Mhz processor (CPU) minimum, 64 Mb RAM, internet connection

If you are used to an Operating System like **Windows** or **MacOSX** you may have installed software by downloading it from a website and double clicking on the downloaded file, and clicking through all the licence agreements, configuration options etc. This is the 'old' way of installing software. The 'new' way is much smarter - you choose what you want to install from a list and press 'go'. The rest - finding the files, downloading the files, installing software, is taken care of by Ubuntu itself while you go and get a cup of tea or work on something else. It can't get much easier.

However, new ways take a little getting used to, and so we will first look at the basic tool needed to install software this way, and then how to use it to install Audacity.

SYNAPTIC PACKAGE MANAGER

The Synaptic Package Manager (SPM) is used for more than just installing software. It can also upgrade your entire operating system, and manage all software installed on your computer. However most people use SPM for just installing new software. Before you embark on this process there are a few concepts that you may wish to get familiar with. Its not crucial you understand them throughly, so just read the explanations and then let it soak in over time. The ideas behind SPM will become clearer with use.

What is a repository?

SPM can automate the installation of software on your computer because it has a direct connection to one or more online software repositories. These repositories are vast archives of softwares that have been pre-configured for installation on your operating system . When your computer is online SPM can connect to these archives, check what software is available for installation, and present you with a list of installable software. All you have to do is select the software from the list that you want. SPM then downloads the software from the repository and takes care of the installation process.

So SPM is actually a repository manager, it manages which repositories (there are many) you wish to access, and which softwares to download and install from those repositories.

SPM allows you to choose which repositories it accesses through its settings. The default repositories used by Ubuntu can be extended through the SPM settings so you can access a wider range of softwares. Ubuntu calls each repository by a simple name. They are : **Main**, **Universe**, **Multiverse**, **Restricted**. By default Ubuntu only uses the **Main** online repository. If you wish to access you the other repositories you must do this by changing repository settings of SPM.

What is a package?

When SPM downloads a software for installation it is in the form known as a 'package'. This means that it is a compressed archive of the software, pre-configured so that it will install nicely on your computer. If the package has been configured nicely, and Ubuntu spends a lot of time making sure this is the case, then many of the headaches that installing software can bring are taken away - its the panadol of software installation. One of the biggest issues with installing software on any form of Linux (Ubuntu is one of many types of Linux), are **dependencies**. Dependencies are all the other softwares required by a particular software. If, for example, I want to install a audio editor, that audio editor software may use some functionality of other softwares to do its job.

SPM takes the (often) dark art of dependencies away from you, and manages this itself. So if you wish to install a software and it has dependencies (and the list can be long), you don't have to work this out yourself, SPM knows already what is needed, finds it, and installs it along with the software you have chosen.

So, SPM, as well as managing which repositories you access, is also a package management software. Hence the name - Synaptic *Package Manager*.

apt

You don't really need to know about apt, so if you are on the verge of being confused then don't read this short section. If you are a geek wannabe then read on.

Ubuntu is a form of Linux that has derived from another form of Linux - Debian. This family of Linux has in common (amongst other things) the package/repository management system. Both Ubuntu and Debian use the **apt** system for managing packages. APT is actually an acronym short for **Advanced Package Tool**.

SPM is actually a 'front end' (graphical interface) for controlling apt. So SPM is the nice user interface that you see, but the real work is done by apt. There are other ways of managing apt also, such as the command line interface known as **apt-get**. In the world of Linux there are many varieties of Linux users and they have their own ways of doing things. In general its safe to say most Debian users use apt-get, and most Ubuntu users are happier using SPM.

CONFIGURING SYNAPTIC PACKAGE MANAGER FOR INSTALLING AUDACITY

To install Audacity on Ubuntu you will need to change the default repository settings of SPM as Audacity is not contained in the default repository. To do this you will need to open the Synaptic Package Manager and you can do this via the **System** menu. If you haven't changed the default Desktop of Ubuntu then the System menu can be accessed at the top left of your screen:

If all is good you will be prompted for a **password**.

Here you must enter your password (the same one you use to log into the system). If you don't know the password then you have a problem and its probably caused by the fact that the computer you are using is not yours. In this case you have to find the computers owner and ask them for the password (which is usually not polite unless you know them well) or ask them to input the password while you look casually in the other direction.

Assuming the password entered is correct - you will now see the SPM open infront of you. It may be that you first see the following 'Quick Introduction' (this appears if you haven't used SPM before).